

Date:	9/11/98 MSDS No.: CAN-M 90 -C
Supersedes:	9/30/95
Trade Name:	Drag'N-Arc Stainless Electrodes
Sizes:	All

# MATERIAL SAFETY DATA SHEET

## For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

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**Product Type:** Covered Electrode  
**Products:** Drag'N-Arc 308/308L, 309/309L, 316/316L  
**Prepared by** The Lincoln Electric Company, Cleveland, Ohio, USA  
(216) 481-8100, on the date shown above.

### IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section VII; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

- (1) The term 'hazardous' in 'Hazardous Ingredients' should be interpreted as a term required and defined in the Hazardous Products Act and does not necessarily imply the existence of any hazard.

Ingredients:	CAS No.	Wt. %	TLV mg/m <sup>3</sup>	LD <sub>50</sub> (Route/Species)	LC <sub>50</sub> mg/m <sup>3</sup> (Route/Species)
Titanium dioxides (as Ti)	13463-67-7	10-30	10	Not available	Not available
Chromium and chromium alloys or compounds (as Cr)	7440-47-3	5-10	0.5(b)	2.16 mg/kg LDLo (intravenous/rat) tumorigenic	Not available
Mineral silicates	1332-58-7	5-10	5**	590 g/kg LDLo (oral/rat) reproductive	Not available
Limestone and/or calcium carbonate	1317-65-3	1-5	10	Not available	Not available
Nickel (metal)	7440-02-0	1-5	1	50 mg/kg LDLo (intravenous/mouse)	Not available
Silicates and other binders	1344-09-8	1-5	10*	1153 mg/kg (oral/rat)	Not available
Molybdenum alloys (as Mo) (316 type only)	7439-98-7	1-5	10	114 mg/kg LDLo (intraperitoneal/rat)	Not available
Manganese and/or manganese alloys and compounds (as Mn)	7439-96-5	1-5	0.2	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Iron	7439-89-6	0.1-1	10*	Not available	Not available
Fluorides (as F)	7789-75-5	0.1-1	2.5	4250 mg/kg (oral/rat)	Not available
<b>Stainless steel core wire</b>		65			
Nominal core wire composition:					
Chromium	7440-47-3	20-30	0.5(b)	2.16 mg/kg LDLo (intravenous/rat) tumorigenic	Not available
Nickel	7440-02-0	10-13	1	50 mg/kg LDLo (intravenous/mouse)	Not available
Molybdenum (316 type only)	7439-98-7	2.5	10	114 mg/kg LDLo (intraperitoneal/rat)	Not available
Manganese	7439-96-5	2.0	0.2	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Iron	7439-89-6	bal.	10*	Not available	Not available

**Notes:** (\*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(\*\*) As respirable dust.

(LDLo, LCLo) Lowest published toxic concentration.  
(b) TLV-PEL for water soluble chromium (VI) is 0.05 milligrams per cubic meter. The OSHA PEL is ceiling value that shall not be exceeded at any time. The TLV for insoluble chromium (VI) is 0.01 milligrams per cubic meter.

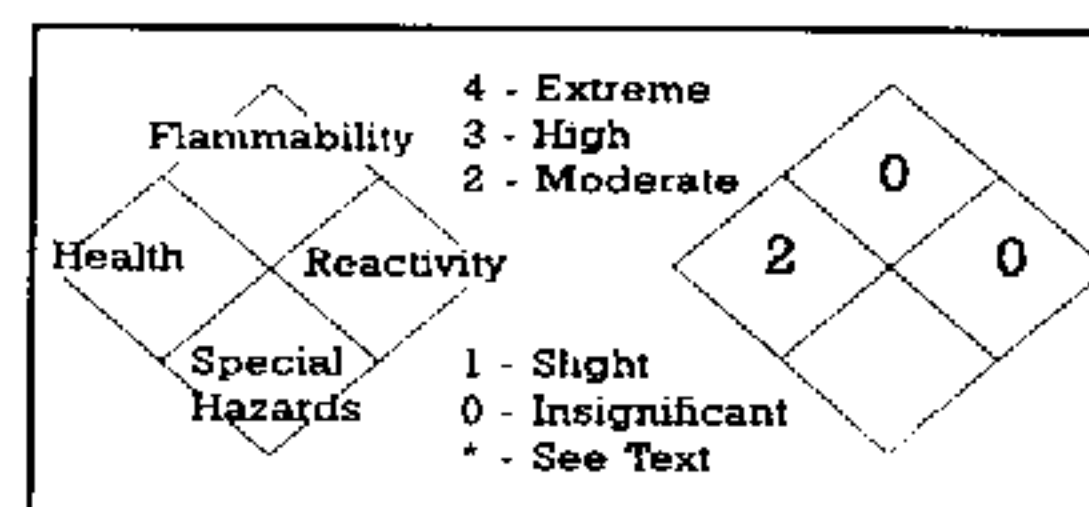
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See CSA W117.2 Section 9.7 as referenced in Section VIII.

(CONTINUED ON SIDE TWO)

Product: Drag'N-Arc Stainless Electrodes

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**Acute Lethality Values:**  $LC_{50}$  means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

$LD_{50}$  means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

**Threshold Limit Value:** The ACGIH recommended general limit for Welding Fume NOC - (Not Otherwise Classified) is  $5 \text{ mg/m}^3$ . The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

**Effects of Overexposure:** Electric arc welding may create one or more of the following health hazards:  
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Chromates present in the fume have been known to cause severe irritation of the bronchial tubes and lungs. Asthma has been reported. Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Chromates may cause ulceration and perforation of the nasal septum. Liver damage and allergic reactions, including skin rash, have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash. Chromium and nickel and their compounds are on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*  
Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

**Hazardous Decomposition Products:** Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily fluorides and complex oxides of iron, potassium and silicon; secondarily complex oxides of aluminum, chromium, manganese, molybdenum, nickel, sodium and titanium.

Maximum fume exposure guideline for this product (based on Cr (VI) content) is 0.8 milligrams per cubic meter.  
The OSHA PEL (Permissible Exposure Limit) is a ceiling value that shall not be exceeded at any time.  
Keep exposure as low as possible. Indoors, use local exhaust; outdoors, a respirator may be required.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.4, and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 'Safety in Welding, Cutting, and Allied Processes' published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

**Ventilation:** Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. Keep exposure as low as possible.

**Respiratory Protection:** Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

**Eye Protection:** Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

**Protective Clothing:** Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin... or clothing or gloves if they are wet. Insulate from work and ground.

**Disposal Information:** Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted.

Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.